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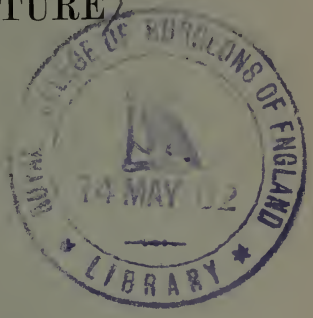
THE QUESTION OF SPINAL BRACES IN LATERAL CURVATURE



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THE QUESTION OF SPINAL BRACES IN LATERAL CURVATURE.

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It has been proposed that apparatus having a strong antero-posterior action for the maintenance of lordosis be used, instead of braces which make the customary pressure on the ribs, in lateral curvature of the spine. Experiments in this direction have, however, resulted in nothing notable, and the suggestion has been fruitless, so far as I am aware.[1] It may be that the inconvenience of wearing such a brace is too great in a disease which carries with it no menace to the patient's life and but little to her health and comeliness. It might be argued, but not too seriously, that lateral curvature of the spine is an attractive feature, falling in the same category as a slight cast or squint, which has been thought to add piquancy to the beauty of a pretty face. It cannot be denied that the typical sigmoid curvature reproduces the technical curved line of beauty, or that the accompanying rotation carries with it an expression of serpentine or sinuous grace.

It is true that in rare instances the rotation is so extreme that the kyphos rivals that of an ill-treated case of Pott's disease. As a rule, however, the deformity is not conspicuous, and we are generally satisfied with the results of treatment which is palliative rather than radical. For some reason or other we do not pursue the treatment of this affection with the earnestness which marks our efforts in club-foot, for instance. If, however, it were necessary to overcome absolutely a lateral curvature it would not be too much to require a patient to wear a steel brace for the production of lordosis for as many years as might be considered necessary in a

[1] Transactions of the New York Academy of Medicine, 1876, p. 330.

growing girl. In Pott's disease the forcible production of lordosis transfers compression from the vertebral bodies to the processes which as a rule are healthy. The same force in lateral curvature produces the same effect, taking superincumbent weight from the bodies which depart from, and putting it on the processes which are held near, the median plane. This provides a mechanical application directed against rotation, which is the most intractable element of the deformity.

FIG. 1.

FIG. 2. FIG. 3. FIG. 4.

Such may never be the established treatment, but an appreciation of the mechanics involved makes clear the fact that rotation is produced by the lateral mobility of the anterior section of the column combined with the absence of such mobility in the posterior section.

An interesting contribution to the study of this subject is the suggestion that rotation in lateral curvature may be determined by the flexion or extension of the spine. As an aid in this inquiry

I arranged for photography an imitation of the spine, made of India-rubber (Fig. 1), in order to see whether antero-posterior variation would influence rotation in any way. The middle pin is taken point-blank in each photograph in order to secure the same point of view in each exposure. In Fig. 2 there is a plain lateral curve without flexion or extension. The heads only of the pins are seen, showing the absence of flexion, extension, and rotation. In Fig. 3 a lateral curve is combined with flexion. The latter is shown by the inclination of the pins, and the absence of rotation is demonstrated by the fact that the head only of the middle pin is visible, while the heads of all the pins are found in the middle of the curved column. In Fig. 4 a lateral curve is combined with extension, as is shown by the inclination of the pins. Some rotation is apparent, but this would have disappeared if the object had been placed more carefully before the camera so that only the head of the middle pin had been exposed.

From this it would appear that rotation of the spine is unaffected by its flexion or extension, a result which might have been expected *a priori*, because the curve in any case is but a simple curve and incompetent, as such, to govern rotation. In Figs. 3 and 4 the curve may at the first glance seem to be made up of two curves, a lateral and an antero-posterior one, but further consideration leads to the view that it is a simple curve, produced by the resultant of two forces, one acting in an antero-posterior and the other in a lateral plane, and as such it has no more power over rotation than any other simple curve.

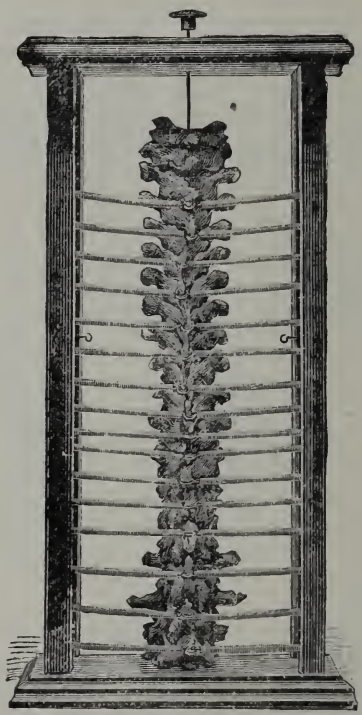
It may be said that any rod or flexible column cannot, of itself, rotate when curved. The spine, however, is a flexible column, a part of which, made up of the vertebral bodies, has wide lateral displacement (or has extra flexibility) in the cavity of the trunk, while another part, composed of the processes, is prevented from lateral displacement (or has less flexibility) from being a constituent part of the wall of the cavity. It therefore rotates when curved. This view was presented by Mr. Charles H. Rogers-Harrison in 1842.[1] The mechanics of spinal rotation thus described in words is shown in the common preparation of the vertebral

[1] Deformities of the Spine and Chest, London, pp. 93, 94.

column, Figs. 5 and 6, in which the processes are held near the median plane by a succession of spiral wire springs, while the bodies, swinging away from the median plane, exhibit rotation.

The application of posterior pressure is demanded by the mechanics of the deformity which, on the other hand, furnish no warrant for the use of a brace making lateral pressure on the ribs.

Fig. 5.

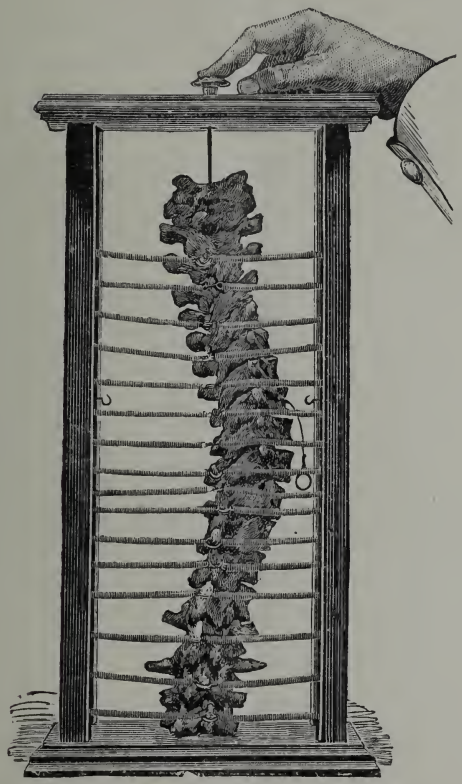


Such a brace may promote comfort and conceal asymmetry, but if it is applied with force it will add to the deformity. As the ribs spring from the posterior section of the column, pressure on them will push the spinous processes still further toward the concavity, and thus increase the rotation, as was pointed out by Mr. Andrew Dods in 1824.[1] The difficulty may be readily appreciated by

[1] The Rotated or Contorted Spine, London, pp. 226, 227.

imagining the effect of lateral pressure made directly on the vertebral bodies without the intervention of the ribs. The effect of such an application, impossible as yet, would be to combat, by one

FIG. 6.



motion, both the lateral curvature and the rotation, at once correcting the deformity in simple cases in which structural changes were absent.